

ABSTRACT

A pitch sensor tool for a stem boring or drilling machine, for example a sub-surface directional drilling machine having a stem and a drilling head. The pitch sensor tool includes a generally cylindrical housing adapted to be mechanically coupled to the stem and to the drilling head, and a pitch sensing device disposed in or on the housing and adapted to transmit a reading of the second pitch of the pitch sensor tool. In one example, the pitch sensing device is housed in a compartment in the pitch sensor tool. A boring or drilling tool incorporates the pitch sensing tool and a drilling head, and a stem boring or drill machine incorporates the pitch sensing tool. By separating of the pitching sensing device from the rotating parts (i.e., drilling head or guide head) the pitch reading can be measured accurately and during a drilling procedure, as well as after it.